

Why is it necessary to ensure that turbine is on barring (turning gear) before gland sealing steam comes into service?

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6 Answers



Shantanu Maheshwari, former Senior Engineer at Triveni Turbines (2015-2018)
Answered Feb 16



There are two cases of particularly which this condition must be filled. However it is always true that turbine should be on barring gear .

CASE 1

COLD START (TURBINE STARTING IN COLD CONDITION)

Rotor is big enough in length and is supported at two bearings at extreme ends. It acts like simply supported beam. Rotor is bound to sag in this condition and if it is rolled at higher rpm in this condition, you will encounter with high vibration (for this read things about deflection). To remove this sagging it is must that turbine must be on barring gear before rolling that too at least 8 hours (recommended)

CASE 2

HOT START UP

When turbine has tripped and again started within 6 hours. In this condition top casing is generally hotter than bottom casing as hot air tends to move up due to less density. If turbine is not rolled on barring gear, the upper part of rotor will be subjected to higher temperature than the lower part of it. By rolling shaft at slower rpm, we ensure that it does not fall victim of uneven expansion.

NOW talking about gland sealing - the major purpose of which is to help in maintaining vacuum and hence relating barring gear with vacuum makes much less sense. BUT ONLY THING IMPORTANT IS THAT TURBINE SHOULD ALWAYS BE ON BARRING GEAR BEFORE ROLLING

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Shahid Suhaeyeb Abdullah, aware!!But dont care!!

Answered Jul 28, 2015



The durarion for providing gland steam in turbine gland packing, is quiet high, extending from 1-4 hours , *depending on the time taken for turbine warm up.*

Supplying steam(*of temp around 250-300°C*) at only one portion may result in uneven expansion.

Hence it advisable to rotate the rotor during warm up/ gland supply.

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Honey Sunny

Answered Jul 6, 2016



Barring gear (or "turning gear") is the mechanism provided to rotate the turbine generator shaft at a very low speed after unit stoppages. Once the unit is "tripped" (i.e., the steam inlet valve is closed), the turbine coasts down towards standstill. When it stops completely, there is a tendency for the turbine shaft to deflect or bend if allowed to remain in one position too long. This is because the heat inside the turbine casing tends to concentrate in the top half of the casing, making the top half portion of the shaft hotter than the bottom half. The shaft therefore could warp or bend by millionths of inches.

This small shaft deflection, only detectable by eccentricity meters, would be enough to cause damaging vibrations to the entire steam turbine generator unit when it is restarted. The shaft is therefore automatically turned at low speed (about one percent rated speed) by the barring gear until it has cooled sufficiently to permit a complete stop.

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Mitesh Bhatia, I write by experience.

Answered Jun 16



A lot has been written about, why barring gear is essential in other answers.

But why to admit gland steam only after turbine on turning or barring gear is simply because if you apply steam or sealing steam or gland steam (all same) to a stationary rotor, there would be localised heating. This would induce vibrations upon a subsequent start up.

Localised heating refers to rotor being heated at a few points vis-a-vis uniform heating. When barring gear is in operation, there is a uniform distribution of heat applied along the shaft.

That's why the turbine needs to be on turning, prior to charging gland steam.

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Nitesh Garg, Rotary Equipment Engineer. More than 8 years of experience

Answered Aug 22, 2016



Barring of turbine rotor is must to eliminate the possibility of rotor sagging.

Sagging happen when you keep rotor simply supported and itz subjected to high temperature.

So if you don't start barring and charge gland steam then rotor will get heat from gland steam and sagging may happen.

By the way with gland steam charging turbine also put on heating so that is more relevant reason

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Tejaswi Monangi, Chemical Engineer

Answered Feb 16



Barring of shaft is done after a trip/during start up to ensure uniform heat dissipation / distribution through out the shaft cross section to prevent bowing or unwanted shaft deformation. It is for this very purpose that the gland sealing steam needs to be introduced only after turning gear/barring started.